

Patent claims:

1. Machine with an electromechanical converter, with a linear movable piston (30; 66) which is arranged in a tubular cylinder (20; 60) to operate as a working element in a motor or a generator and which is provided with magnetic elements which establish an outwardly
5 directed electrical field of force, which is effective towards a surrounding row of tubular coils (21a; 64), where at each end of the cylinder (20; 60) is formed a gas spring which forms a resonance-effective arrangement, and where the interaction between the magnetic fields of the coils (21a; 64) and the magnetic elements (38; 68) respectively obtain energy transmission between the electrical energy in the coils and the mechanical energy of the
10 axial movement of the piston (30; 66) in the cylinder (20; 60), **characterized in**
- that the cylinder (20; 60) is closed to form tight end chambers (40; 50), so that there at each end of the piston there is formed a gas spring of high pressure,
 - that the piston supports a row of centrally placed tubular permanent magnets (38; 68) or alternative coils, and
 - 15 - that the cylinder comprises a row of coordinated coils (21a; 64) or alternative permanent magnets for increasing the machine's piston area and/or the piston's length of stroke.
2. Machine according to claim 1, **characterized in** that the piston (30) comprises a
20 concentric row of tubular magnetic elements (38) which are placed with a mutual intermediate gap, and that in these gaps are arranged tubular coil arrangements (21) with coils (21a) for increasing the area of the piston.
3. Machine according to claim 2, **characterized in** that the piston, is at least on one end,
25 connected to a piston bar (34, 35), said piston bar is guided out through an end chamber (40, 50) for transferring the mechanical energy to or from the machine.
4. Machine according to claim 2 or 3, **characterized in** that the mass of the piston is
over 4 kg.
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5. Machine according to one of claims 2-4, **characterized in** that the area of the piston with a machine with a length of stroke of about 10 cm is greater than 0,03 m².

6. Machine according to one of claims 1-5, **characterized** in that the pressure inside the casing at each side of the piston (30) in the end chambers (40, 50) is over 10, preferably over 30 bar.

5 7. Machine according to claim 1, **characterized** in that the walls of the cylinder are formed of a thin-walled tube (65) made out of electrically and magnetically non-conductive material, which works as a slide bearing, and which serves as support for the coil windings (64).

10 8. Machine according to claim 7, **characterized** in that there at least at one end of the cylinder (60) is placed a helical spring, which ensures the central rest position of the piston in view of vertical installation.

15 9. Machine according to claim 7, **characterized** in that the permanent magnets are multipolar, particularly assembled of several magnets with or without iron in-between, so that more than two magnetic poles along the piston are formed.

20 10. Machine according to claim 1, **characterized** in that the permanent magnets surround the piston and the coil windings lie inside the piston.

25 11. Machine according to claim 7, **characterized** in that the casing (60) is arranged to be connected directly to a load or a driving unit.

30 12. Application of a machine according to the invention, **characterized** in that it will be placed directly on an element which shall be vibrated, without a piston bar.

35 13. Application according to claim 12, **characterized** in that the machine will be coupled on the rear of the bit of a drill steel for drilling for oil and mining operations, to generate hammer drilling with an ordinary drill.

40 14. Application according to claim 12, **characterized** in that the machine will be coupled to a tube or a beam which shall be driven down into the ground.